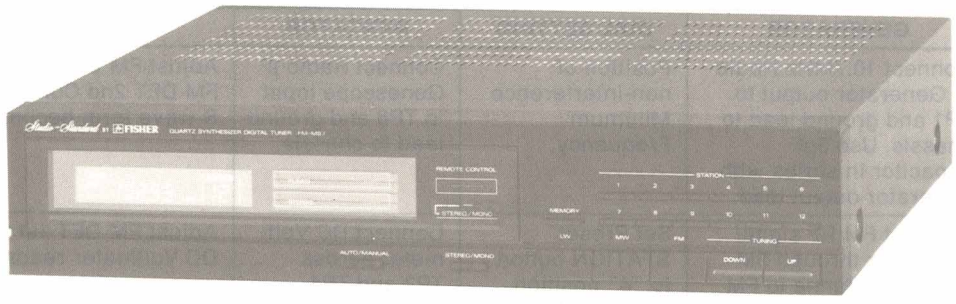
SERVICE MANUAL

FISHER

LW/MW/FM STEREO SYNTHESIZER TUNER

FM-M87

(EUROPE/SPAIN)



125 967 40

SPECIFICATIONS

FM SECTION

Usable Sensitivity	
Mono	1.0 µV
46 dB Quieting Sensitivity	
Mono	4.0 µV
Signal-to-Noise Ratio	
Mono	70 dB
Stereo	63 dB
Capture Ratio	1.5 dB
Alt. Channel Selectivity (±300 kHz)	50 dB
Image Response Ratio	70 dB
Spurious Response Ratio	90 dB
IF Response Ratio	> 100 dB
AM Suppression Ratio	60 dB
Total Harmonic Distortion at 60 dBf	
Mono (1kHz)	0.15 %
Stereo (1kHz)	0.25 %
Stereo Separation	
(100 Hz/1 kHz/10 kHz)	40/40/30 dB
Sub-Carrier Rejection (19 kHz/38 kHz)	35/45 dB
Audio Frequency Response	
(20 Hz - 15 kHz)	±0.1/−2.5 dB

MW SECTION

Usable Sensitivity	550 µV/m
Selectivity (±9 kHz)	35 dB
Signal-to-Noise Ratio	55 dB
Image Response Ratio	40 dB
IF Response Ratio	70 dB

LW SECTION

Usable Sensitivity	1800 µV/m
Selectivity (±9 kHz)	35 dB
Signal-to-Noise Ratio	53 dB
Image Response Ratio	50 dB
IF Response Ratio	70 dB

GENERAL

Power Requirements	AC 16V
	8W
Dimensions (W x H x D)	360 x 79 x 300 mm
Weight (approx.)	2.5 kg

– Specifications and design are subject to change without notice. –

REFERENCE No. WM-570052

CAUTION ON RF ADJUSTMENT

This model uses a microprocessor for memory preset control for the various bands.
This function has been used to preset frequency points for the different bands to permit adjustment and make it possible to check the function of the microprocessor. To use this supplemental function, ground initialize test point TP7 for 1 second before beginning adjustment. The following table shows the initially preset frequencies.

Band	Memory					
	1	2	3	4	5	6
FM-1	87.5MHz	108MHz	88MHz	98MHz	108MHz	90MHz
MW/LW	603kHz	1404kHz	999kHz	160kHz	350kHz	250kHz

FM TUNER ALIGNMENT

FM ALIGNMENT – FUNCTION switch to FM/STEREO position.
Note: It is almost unnecessary to adjust coil in Front End as perfectly adjusted

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
1. FM IF S-CURVE ALIGNMENT	Connect 10.7MHz Radio IF Generator output to TP1 and ground lead to chassis. Use 5pF capacitor in series with generator output lead.	Position of non-interference Minimum Frequency.	Connect Radio IF Genescope input to TP5 and ground lead to chassis.	Adjust FM DET 1st Coil (T106) and FM DET 2nd Coil (T107) so that S-wave form becomes symmetrical.
2. DETECTOR ADJUSTMENT (MINIMUM T.H.D.)	Connect FM RF signal generator through FM Dummy Antenna to FM Antenna terminals. Set generator output level to 60dBμV at 98MHz±2kHz.	Set Preset STATION button to "4" position. Set to 98MHz. Set MODE switch to MONO.	Connect DC Voltmeter across TP3 and TP4.	Adjust FM DET 1st Coil (T106) until DC Voltmeter reads 0V ±50mV.
			Harmonic Distortion Analyzer to SPEAKER OUT.	Adjust FM DET 2nd Coil (T107) for minimum gain and best linearity.
Note: Repeat Step 1 (FM DET 1st Coil T106) and 2 (FM DET 2nd Coil T107) until optimum alignment is reached.				
3. FM MUTING LEVEL ADJUSTMENT	Same as above. Adjust attenuator output level for 18dBμV.	Same as above.	Front panel TUNED Display Indicator.	Set MODE Switch to STEREO. Adjust P101 until the TUNED Indicator partly light up.
Note: Decrease the output level of ATT and confirm that the wave form disappears. Increase the output level of ATT again and confirm that the input level meets the specifications sufficiently when the wave form has appeared.				
4. FM STEREO SIGNAL SEPARATION CONTROL	Connect FM Stereo SG to FM Antenna terminals. 19kHz signal ON. Main channel, sub channel signal ON. Apply 1000Hz signal from LEFT channel.		Connect AC VTVM and Oscilloscope to SPEAKER OUT.	Adjust P103 for minimum output.
	Same as above for RIGHT channel.		Connect AC VTVM and Oscilloscope to SPEAKER OUT.	

Use a screwdriver with plastic grip for all adjustments.

MW/LW Frequency Cover Range
Tuning Voltage Value at TP2

(Table 1)

	153kHz	360kHz	522kHz	1611kHz
Minimum	0.7V	6.0V	1.0V	7.0V
Typical	0.93V	6.7V	1.3V	8.03V
Maximum	1.2V	8.0V	1.4V	9.0V

AM TUNER ALIGNMENT

AM ALIGNMENT – FUNCTION switch to MW or LW position.
Maintain generator output as low as possible for suitable indication.

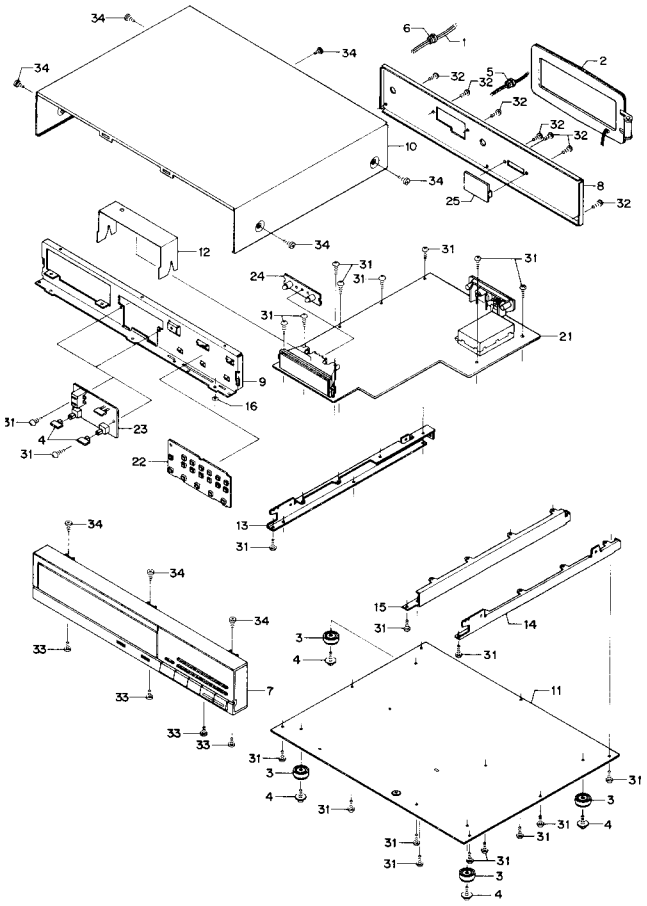
Note: Perform this alignment after FM Tuner Alignment.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
1. AM IF ALIGNMENT	Connect 450kHz Radio IF Genescope output to Pin W1 and W2 Adjust output level to 70dBμV.	Position of non-interference Minimum Frequency.	Connect Radio IF Genescope input to TP6 and ground lead to chassis.	Adjust AM IFT (T105) for maximum gain and best symmetry. Keep signal low enough for noise on response.
2. MW RF FREQUENCY COVER ALIGNMENT (1611kHz)	Do not connect generator.	Front Panel DIGITAL Counter Display Set to 1611kHz.	Connect DC Voltmeter to TP2 and ground lead to chassis.	Check DC Voltmeter for Indication 7.0V ~ 9.0V.
3. (522kHz)	Same as above.	DIGITAL Counter Display Set to 522kHz.	Same as above.	Check DC Voltmeter for Indication 1.0V ~ 1.4V.
Note: Repeat the adjustments in items 2 and 3. Then, confirm that each voltage becomes 1.3V to 8.03V at receiving frequency of 522kHz to 1611kHz. **(See Table 1)**				
4. LW RF FREQUENCY COVER ALIGNMENT (360kHz)	Do not connect generator.	Front Panel DIGITAL Counter Display Set to 360kHz.	Connect DC Voltmeter to TP2 and ground lead to chassis.	Check DC Voltmeter for Indication 6.0V ~ 8.0V.
5. (153kHz)	Same as above.	DIGITAL Counter Display Set to 153kHz.	Same as above.	Check DC Voltmeter for Indication 0.7V ~ 1.2V.
Note: Repeat the adjustments in Items 4 and 5. Then, confirm that each voltage becames 0.93V to 6.7V at receiving frequency of 153kHz to 360kHz. **(See Table 1)**				
6. MW RF TRACKING ALIGNMENT (603kHz)	Connect Standard Loop Antenna to output terminal of AM RF Signal Generator. Place Loop Antenna 60cm away from Loop antenna (Unit). Generator Setting to 603kHz or 1404kHz. Modulate with 400Hz (30 % modulation).	Set Preset STATION button to "1" position. Set to 603kHz.	Connect AC VTVM and Oscilloscope to SPEAKER OUT.	Adjust MW ANT Coil (T101) for maximum gain output.
7. (1404kHz)		Change Preset STATION button to "2" position. Set to 1404kHz.	Same as above.	Adjust MW ANT Trimmer (TC101) for maximum gain output.
Note: Repeat the adjustments in Items 6 and 7. Then, confirm there is no tracking error.				
8. LW RF TRACKING ALIGNMENT (160kHz)	Change generator setting to 160kHz.	Set Preset STATION button to "4" position. Set to 160kHz.	Connect AC VTVM and Oscilloscope to TUNER OUT.	Adjust LW ANT Coil (T102) for maximum gain output.
9. (350kHz)	Change generator setting to 350kHz.	Change Preset STATION button to "5" position. Set to 350kHz.	Same as above.	Adjust LW ANT Trimmer (TC102) for maximum gain output.
Note: Repeat the adjustments in Items 8 and 9. Then, confirm there is no tracking error.				
10. AM AUTO STOP SENSITIVITY ADJUSTMENT	Change generator setting to 999kHz and output level to 60dBμV/m.	Set Preset STATION button to "3" position. Set to 999kHz.	Front Panel TUNED Indicator Display.	Adjust P102 until the Indicator partly light up.

Use a screwdriver with plastic grip for all adjustments.

CABINET & CHASSIS PARTS LIST/EXPLODED VIEW

Ref. No.	Part No.	Description	Q'ty
PACKAGE			
	620 190 3041	Box Corrugate-Exp.	1
	620 148 3833	Pad (Left)	1
	620 148 3840	Pad (Right)	1
	620 191 9202	Pad	1
	620 148 8029	Sheet Polyethylene	1
	620 148 9118	Sheet Patching	1
ACCESSORIES			
	620 190 2570	Connector 10P Assy	1
	620 038 1673	FM Antenna Assy	1
	620 057 8783	Bag Fan	1
	620 148 4571	Poly Cover	1
	620 152 2624	Certificate Card	1
	620 190 2778	Explanatory Booklet	1
	411 123 3906	SCR TPG BIN 3X10	2
	620 062 0543	Serial No. Sheet	1
	620 113 5312	Stand Loop Antenna	1
CABINET			
	620 062 0505	Manufacturing No.	1
	620 125 8424	Wire Band	2
1	620 022 1153	Plug Cord Power BK	1
2	620 028 2734	AM Loop Antenna	1
3	620 047 3873	Leg	4
4	620 051 3708	Screw, Braz. Hd. Tap.-B, +M3.0X8	4
5	620 053 1986	Bushing	1
6	620 053 2136	Bushing	1
7	620 190 2624	Cabinet Front Assy	1
8	620 190 2686	Panel Rear	1
9	620 093 1182	Panel Front	1
10	620 094 8388	Cover Top	1
11	620 191 9141	Plate Bottom	1
12	620 115 0001	Shelter	1
13	620 117 2737	Metal Mount (Left)	1
14	620 117 2751	Metal Mount (Right)	1
15	620 117 2768	Metal Mount (Center)	1
16	620 125 4969	Washer	1
21	620 189 5254	Tuner P.C.B. Assy	1
22	620 189 5643	Switch P.C.B. Assy	1
23	620 189 5650	LED IND. P.C.B. Assy	1
24	620 189 5278	Lamp P.C.B. Assy	1
25	620 190 7483	Plug P.C.B. Assy	1
31	411 020 8004	SCR S-TPG BRZ 3X8	22
32	411 099 9803	SCR S-TPG BRZ 3X8	7
33	411 021 3206	SCR S-TPG BIN 2.6X8	4
34	411 021 5903	SCR S-TPG BIN 3X6	8



NOTES:

1. Parts order must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and resistors must be multiple of 10 pcs.

PRODUCT SAFETY NOTICE

Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual. Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

P.C.BOARD PARTS LIST

Ref. No.	Part No.	Description	Q'ty
TUNER P.C.B. ASSY			
21	620 189 5254	Tuner P.C.B. Assy	1
	620 000 4138	FM Frontend 4EU AGC	1

(Component parts used in Front End are not serviceable and available.)

ICP1	620 017 0734	Protector ICP-5	1
	620 017 2721	Fuse Clip	2
	620 022 2921	ANT Terminal 3P	1
	620 022 3508	Terminal Lug	1
	620 031 4763	Wire Wrap Terminal	11
	620 053 8848	Plate Heat Sink	1
	620 053 9821	Reflector	1
	620 191 0414	Filter	1
	620 186 7275	Plate Earth	1
	620 190 0521	Cover Shield	1
	620 189 5872	Plate Sever	1
⚠	423 005 0507	FUSE 250V T1A	1
	411 020 8004	SCR S-TPG BRZ 3X8	1
JW101	620 055 2431	Jumper	1
JW102	620 055 3063	Jumper	1
JW103	620 055 2400	Jumper	1
JW104	620 055 2769	Jumper	1
JW105	620 055 2462	Jumper	1
JW106	620 055 3025	Jumper	1
F101	620 026 9353	FTZ Antenna Filter	1
F103	620 014 5664	Ceramic Filter	1
F104	620 014 5664	Ceramic Filter	1
F105	620 014 5862	Ceramic Filter 450kHz	1
F106	620 026 4396	Anti Birdie Filter	1
F107	620 026 4754	Low Pass Filter	1
F108	620 026 4754	Low Pass Filter	1
L101	620 026 5522	Choke Coil 470μH	1
L102	620 026 7915	Chocke Coil 100μH K	1
L103	620 026 7915	Chocke Coil 100μH K	1
LCD1	620 030 9363	LCD	1
P101	620 006 1353	Potentiometer (B-100kΩ)	1
P102	620 006 1377	Potentiometer (B-10kΩ)	1
P103	620 006 1353	Potentiometer (B-100kΩ)	1
T101	620 028 1348	MW Antenna Coil	1
T102	620 028 1362	LW Antenna Coil	1
or	620 028 2901	LW Antenna Coil	1
T103	620 028 7784	OSC Coil MW	1
or	620 028 7760	OSC Coil MW	1
T104	620 028 7845	OSC Coil LW	1
or	620 028 7821	OSC Coil LW	1
T105	620 027 7280	AM IFT	1
or	620 027 7006	IFT AM	1
T106	620 027 7242	IFT, FM DET 1st	1
T107	620 027 7259	IFT, FM DET 2nd	1
TC101	620 006 9724	Trimmer Condenser	1
TC102	620 007 0614	Trimmer 20PF	1
X101	620 014 6258	Ceramic	1
X102	620 007 1314	Crystal 7.2MHz	1
or	620 007 1307	Crystal 7.2MHz	1
or	620 007 1321	Crystal 7.2MHz	1
or	620 007 3226	Crystal 7.2MHz	1
IC101	409 134 5408	IC TC9302AF-036	1
IC102	409 072 1005	IC TC9171P	1
IC103	409 073 9505	IC LA1266	1
IC104	409 017 0803	IC LA3400	1
IC105	409 074 0808	IC LA5667	1
Q101	405 027 0604	TR 2SK246-Y	1
Q102	405 021 0907	TR 2SD1012-H-SPA-AC	1
Q103	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q104	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q105	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q106	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q107	405 004 4502	TR 2SA608-F-NP-AA	1
or	405 004 5004	TR 2SA608-G-NP	1
Q108	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q109	405 004 4502	TR 2SA608-F-NP-AA	1
or	405 004 5004	TR 2SA608-G-NP	1
Q110	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q111	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q112	405 004 4502	TR 2SA608-F-NP-AA	1
or	405 004 5004	TR 2SA608-G-NP	1
Q113	405 021 0204	TR 2SD1012-F-SPA-AC	1
or	405 021 0600	TR 2SD1012-G-SPA-AC	1
Q114	405 021 0204	TR 2SD1012-F-SPA-AC	1
or	405 021 0600	TR 2SD1012-G-SPA-AC	1
Q115	405 085 5900	TR 2SK246-Y1	1
or	405 085 5801	TR 2SK246-Y2	1
Q116	405 016 9502	TR 2SC3069	1
Q117	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q118	405 004 4502	TR 2SA608-F-NP-AA	1
or	405 004 5004	TR 2SA608-G-NP	1
Q119	405 016 0806	TR 2SC2839-E	1
or	405 016 1001	TR 2SC2839-F	1
Q120	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q121	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q122	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q123	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q124	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1
Q125	405 003 7702	TR 2SA1346	1
Q126	405 003 7702	TR 2SA1346	1
Q127	405 018 2600	TR 2SC3400	1
Q128	405 018 2600	TR 2SC3400	1
Q129	405 019 2708	TR 2SC536-F-NP-AA	1
or	405 019 3804	TR 2SC536-G-NP-AA	1

If necessary, replace both Diode D101, D102 (SVC321) together with new ones which have the equivalent characteristics.

D101	407 000 4708	VARACTOR DI SVC321C-2	1
or	407 000 4807	VARACTOR DI SVC321D-2	1
D102	407 000 4708	VARACTOR DI SVC321C-2	1
or	407 000 4807	VARACTOR DI SVC321D-2	1
D103	407 008 0405	DIODE GMB01-BT	1
D104	407 005 3805	DIODE DS442-BT	1
D105	407 008 0405	DIODE GMB01-BT	1
D106	407 012 8503	DIODE 1SS53	1
D107	407 008 0405	DIODE GMB01-BT	1
D108	407 008 0405	DIODE GMB01-BT	1
D109	407 012 8503	DIODE 1SS53	1
D110	407 004 9105	DIODE DSF10C-BT	1
D111	407 004 9105	DIODE DSF10C-BT	1
D112	407 004 9105	DIODE DSF10C-BT	1
D113	407 004 9105	DIODE DSF10C-BT	1
D114	407 008 0405	DIODE GMB01-BT	1
D115	407 008 0405	DIODE GMB01-BT	1
D116	407 005 3805	DIODE DS442-BT	1
D117	407 008 0405	DIODE GMB01-BT	1
D118	407 008 0405	DIODE GMB01-BT	1
D119	407 005 3805	DIODE DS442-BT	1
D120	407 008 0405	DIODE GMB01-BT	1
D121	407 008 0405	DIODE GMB01-BT	1
D122	407 005 3805	DIODE DS442-BT	1
D123	407 008 0405	DIODE GMB01-BT	1
C101	403 026 5408	CERAMIC 47P K 50V	1
C102	403 023 1700	CERAMIC 33P K 50V	1
C103	403 069 8404	CERAMIC 0.01U Z 50V	1
C104	403 074 2701	CERAMIC 0.047U Z 50V	1
C105	403 074 2701	CERAMIC 0.047U Z 50V	1
C106	403 069 8404	CERAMIC 0.01U Z 50V	1
C107	403 074 2701	CERAMIC 0.047U Z 50V	1
C108	403 026 5408	CERAMIC 47P K 50V	1
C109	403 074 2701	CERAMIC 0.047U Z 50V	1
C110	403 008 5204	CERAMIC 10P D 50V	1
C111	403 069 8404	CERAMIC 0.01U Z 50V	1
C112	403 074 2701	CERAMIC 0.047U Z 50V	1
C113	403 050 1209	ELECT 2.2U M 50V	1

P.C.BOARD PARTS LIST (Continued)

Ref. No.	Part No.	Description				Q'ty
C114	403 042 0302	ELECT	10U	M	16V	1
C115	403 074 2701	CERAMIC	0.047U	Z	50V	1
C116	403 074 2701	CERAMIC	0.047U	Z	50V	1
C117	403 069 8404	CERAMIC	0.01U	Z	50V	1
C118	403 044 0201	ELECT	47U	M	16V	1
C119	403 069 8404	CERAMIC	0.01U	Z	50V	1
C120	403 049 1609	ELECT	1U	M	50V	1
C121	403 069 8404	CERAMIC	0.01U	Z	50V	1
C122	403 029 0509	CERAMIC	560P	K	50V	1
C123	403 069 8404	CERAMIC	0.01U	Z	50V	1
C124	403 050 7706	ELECT	3.3U	M	50V	1
C125	403 069 8404	CERAMIC	0.01U	Z	50V	1
C126	403 049 1609	ELECT	1U	M	50V	1
C127	403 047 1502	ELECT	4.7U	M	25V	1
C128	403 026 5408	CERAMIC	47P	K	50V	1
C129	403 047 1502	ELECT	4.7U	M	25V	1
C130	403 069 8404	CERAMIC	0.01U	Z	50V	1
C131	403 031 0306	CERAMIC	68P	K	50V	1
C132	403 018 4204	CERAMIC	22P	K	50V	1
C133	403 088 4104	STYRENE	430P	J	50V	1
C134	403 069 8404	CERAMIC	0.01U	Z	50V	1
C135	403 074 2701	CERAMIC	0.047U	Z	50V	1
C136	403 088 1103	STYRENE	330P	J	50V	1
C137	403 069 8404	CERAMIC	0.01U	Z	50V	1
C138	403 074 2701	CERAMIC	0.047U	Z	50V	1
C139	403 057 0908	POLYESTER	0.01U	K	50V	1
C140	403 060 8700	POLYESTER	0.033U	K	50V	1
C141	403 039 2906	ELECT	47U	M	6.3V	1
C142	403 061 8709	POLYESTER	4700P	K	50V	1
C143	403 023 5807	CERAMIC	330P	K	50V	1
C144	403 063 0503	POLYESTER	6800P	K	50V	1
C145	403 056 8608	POLYESTER	1000P	K	50V	1
C146	403 062 0900	POLYESTER	0.047U	K	50V	1
C147	403 042 0302	ELECT	10U	M	16V	1
C148	403 057 0908	POLYESTER	0.01U	K	50V	1
C149	403 050 1209	ELECT	2.2U	M	50V	1
C150	403 042 0302	ELECT	10U	M	16V	1
C151	403 081 8505	POLYPRO	390P	J	100V	1
C152	403 081 8505	POLYPRO	390P	J	100V	1
C153	403 050 7706	ELECT	3.3U	M	50V	1
C154	403 050 7706	ELECT	3.3U	M	50V	1
C155	403 062 5608	POLYESTER	5600P	K	50V	1
C156	403 062 5608	POLYESTER	5600P	K	50V	1
C157	403 048 7602	ELECT	0.47U	M	50V	1
C158	403 049 1609	ELECT	1U	M	50V	1
C159	403 026 5408	CERAMIC	47P	K	50V	1
C160	403 069 8404	CERAMIC	0.01U	Z	50V	1
C161	403 069 8404	CERAMIC	0.01U	Z	50V	1
C162	403 069 8404	CERAMIC	0.01U	Z	50V	1
C163	403 002 2902	CERAMIC	0.01U	M	25V	1
C164	403 057 0908	POLYESTER	0.01U	K	50V	1
C165	403 038 2402	ELECT	100U	M	6.3V	1
C166	403 069 8404	CERAMIC	0.01U	Z	50V	1
C167	403 039 2906	ELECT	47U	M	6.3V	1
C168	403 069 1504	CERAMIC	1000P	K	50V	1
C169	403 049 1609	ELECT	1U	M	50V	1
C170	403 044 0300	ELECT	47U	M	16V	1
C171	403 042 0302	ELECT	10U	M	16V	1
C172	403 038 2303	ELECT	100U	M	6.3V	1
C173	403 022 5907	CERAMIC	33P	J	50V	1
C174	403 022 5907	CERAMIC	33P	J	50V	1
C175	403 069 8404	CERAMIC	0.01U	Z	50V	1
C176	403 039 7802	ELECT	100U	M	10V	1
C177	403 040 6603	ELECT	2200U	M	10V	1
C178	403 069 8404	CERAMIC	0.01U	Z	50V	1
C179	403 069 8404	CERAMIC	0.01U	Z	50V	1
C180	403 069 8404	CERAMIC	0.01U	Z	50V	1
C181	403 069 8404	CERAMIC	0.01U	Z	50V	1
C182	403 069 8404	CERAMIC	0.01U	Z	50V	1
C183	403 045 2808	ELECT	1000U	M	25V	1
C184	403 049 1609	ELECT	1U	M	50V	1
C185	403 040 2704	ELECT	22U	M	10V	1
C186	403 042 0302	ELECT	10U	M	16V	1
C187	403 042 0302	ELECT	10U	M	16V	1
C188	403 009 8105	CERAMIC	100P	K	50V	1
C189	403 009 8105	CERAMIC	100P	K	50V	1
C190	403 009 8105	CERAMIC	100P	K	50V	1
C191	403 009 8105	CERAMIC	100P	K	50V	1
C193	403 069 8404	CERAMIC	0.01U	Z	50V	1
C194	403 069 8404	CERAMIC	0.01U	Z	50V	1
R101	401 009 6602	CARBON	3.3K	JA	1/2W	1
R103	401 016 1102	CARBON	22	JA	1/4W	1
R104	401 024 8001	CARBON	1M	JA	1/6W	1
R105	401 024 7004	CARBON	1K	JA	1/6W	1
R106	401 024 8001	CARBON	1M	JA	1/6W	1
R107	401 026 6609	CARBON	390	JA	1/6W	1
R108	401 026 1000	CARBON	2.7K	JA	1/6W	1
R109	401 024 7004	CARBON	1K	JA	1/6W	1
R110	401 024 7400	CARBON	10K	JA	1/6W	1
R111	401 025 7805	CARBON	2.2K	JA	1/6W	1
R112	401 025 8208	CARBON	22K	JA	1/6W	1
R113	401 016 4806	CARBON	22K	JA	1/4W	1
R114	401 027 5502	CARBON	6.8K	JA	1/6W	1
R115	401 026 1000	CARBON	2.7K	JA	1/6W	1
R116	401 024 7707	CARBON	100K	JA	1/6W	1
R117	401 025 8208	CARBON	22K	JA	1/6W	1
R118	401 027 5502	CARBON	6.8K	JA	1/6W	1
R119	401 027 0309	CARBON	47K	JA	1/6W	1
R120	401 024 7707	CARBON	100K	JA	1/6W	1
R121	401 012 7009	CARBON	10K	JA	1/4W	1
R122	401 020 2904	CARBON	47K	JA	1/4W	1
R123	401 025 7805	CARBON	2.2K	JA	1/6W	1
R124	401 018 3807	CARBON	3.3K	JA	1/4W	1
R125	401 024 7707	CARBON	100K	JA	1/6W	1
R126	401 027 0309	CARBON	47K	JA	1/6W	1
R127	401 016 4806	CARBON	22K	JA	1/4W	1
R128	401 026 9907	CARBON	4.7K	JA	1/6W	1
R129	401 014 4105	CARBON	1.5K	JA	1/4W	1
R130	401 027 9005	CARBON	82K	JA	1/6W	1
R131	401 026 7408	CARBON	39K	JA	1/6W	1
R132	401 025 8208	CARBON	22K	JA	1/6W	1
R133	401 024 7707	CARBON	100K	JA	1/6W	1
R134	401 027 0309	CARBON	47K	JA	1/6W	1
R135	401 012 4107	CARBON	100	JA	1/4W	1
R136	401 016 1102	CARBON	22	JA	1/4W	1
R137	401 026 4308	CARBON	3.3K	JA	1/6W	1
R138	401 024 7400	CARBON	10K	JA	1/6W	1
R139	401 012 4503	CARBON	100	JA	1/4W	1
R140	401 026 9907	CARBON	4.7K	JA	1/6W	1
R141	401 024 7004	CARBON	1K	JA	1/6W	1
R142	401 024 7707	CARBON	100K	JA	1/6W	1
R143	401 026 9907	CARBON	4.7K	JA	1/6W	1
R144	401 025 1902	CARBON	15K	JA	1/6W	1
R145	401 012 8105	CARBON	100K	JA	1/4W	1
R146	401 025 8208	CARBON	22K	JA	1/6W	1
R147	401 027 2600	CARBON	5.6K	JA	1/6W	1
R148	401 016 4806	CARBON	22K	JA	1/4W	1
R149	401 012 8105	CARBON	100K	JA	1/4W	1
R150	401 016 1102	CARBON	22	JA	1/4W	1
R151	401 025 0905	CARBON	130K	JA	1/6W	1
R152	401 025 0905	CARBON	130K	JA	1/6W	1
R153	401 026 4308	CARBON	3.3K	JA	1/6W	1
R154	401 026 4308	CARBON	3.3K	JA	1/6W	1
R155	401 018 3807	CARBON	3.3K	JA	1/4W	1
R156	401 026 4308	CARBON	3.3K	JA	1/6W	1
R157	401 024 7004	CARBON	1K	JA	1/6W	1
R158	401 024 7004	CARBON	1K	JA	1/6W	1
R159	401 027 2600	CARBON	5.6K	JA	1/6W	1
R160	401 027 2600	CARBON	5.6K	JA	1/6W	1
R161	401 025 0004	CARBON	120K	JA	1/6W	1
R162	401 025 0004	CARBON	120K	JA	1/6W	1
R163	401 027 5502	CARBON	6.8K	JA	1/6W	1
R164	401 025 7805	CARBON	2.2K	JA	1/6W	1
R165	401 027 0309	CARBON	47K	JA	1/6W	1
R166	401 024 7707	CARBON	100K	JA	1/6W	1
R167	401 024 7400	CARBON	10K	JA	1/6W	1
R168	401 024 7707	CARBON	100K	JA	1/6W	1
R169	401 020 2904	CARBON	47K	JA	1/4W	1
R170	401 012 5708	CARBON	1K	JA	1/4W	1
R171	401 024 7400	CARBON	10K	JA	1/6W	1
R172	401 026 4308	CARBON	3.3K	JA	1/6W	1
R173	401 024 7004	CARBON	1K	JA	1/6W	1
R174	401 012 7009	CARBON	10K	JA	1/4W	1
R175	401 024 7004	CARBON	1K	JA	1/6W	1
R176	401 024 7004	CARBON	1K	JA	1/6W	1
R177	401 012 5708	CARBON	1K	JA	1/4W	1
R178	401 016 4806	CARBON	22K	JA	1/4W	1
R179	401 017 1804	CARBON	2.7K	JA	1/4W	1

P.C.BOARD PARTS LIST (Continued)

Ref. No.	Part No.	Description	Q'ty
R180	401 018 3807	CARBON 3.3K JA 1/4W	1
R181	401 019 9600	CARBON 47 JA 1/4W	1
R182	401 017 1804	CARBON 2.7K JA 1/4W	1
R183	401 024 7400	CARBON 10K JA 1/6W	1
R184	401 027 5205	CARBON 680 JA 1/6W	1
R185	401 027 2600	CARBON 5.6K JA 1/6W	1
R186	401 024 7004	CARBON 1K JA 1/6W	1
R187	401 027 2600	CARBON 5.6K JA 1/6W	1
R188	401 024 7400	CARBON 10K JA 1/6W	1
R189	401 020 0801	CARBON 470 JA 1/4W	1
R190	401 019 9204	CARBON 47 JA 1/4W	1
R191	401 024 7004	CARBON 1K JA 1/6W	1
R192	401 027 2600	CARBON 5.6K JA 1/6W	1
R193	401 012 4503	CARBON 100 JA 1/4W	1
R194	401 026 4605	CARBON 33K JA 1/6W	1
R195	401 027 0309	CARBON 47K JA 1/6W	1
R196	401 025 8703	CARBON 220K JA 1/6W	1
R197	401 024 7707	CARBON 100K JA 1/6W	1
R198	401 012 7009	CARBON 10K JA 1/4W	1
R199	401 012 7009	CARBON 10K JA 1/4W	1
R200	401 012 7009	CARBON 10K JA 1/4W	1
R201	401 012 7009	CARBON 10K JA 1/4W	1
R202	401 012 7009	CARBON 10K JA 1/4W	1
R203	401 012 7009	CARBON 10K JA 1/4W	1
R204	401 012 7009	CARBON 10K JA 1/4W	1
R205	401 012 5708	CARBON 1K JA 1/4W	1
R206	401 012 5708	CARBON 1K JA 1/4W	1
R207	401 012 5708	CARBON 1K JA 1/4W	1
R208	401 012 5708	CARBON 1K JA 1/4W	1
R209	401 012 5708	CARBON 1K JA 1/4W	1
R210	401 027 0309	CARBON 47K JA 1/6W	1
R211	401 024 7707	CARBON 100K JA 1/6W	1
R212	401 027 0309	CARBON 47K JA 1/6W	1
R213	401 024 7004	CARBON 1K JA 1/6W	1
R214	401 026 6609	CARBON 390 JA 1/6W	1
R215	401 016 3809	CARBON 2.2K JA 1/4W	1
R216	401 019 1000	CARBON 390 JA 1/4W	1
R217	401 027 5205	CARBON 680 JA 1/6W	1
R218	401 024 7400	CARBON 10K JA 1/6W	1
R219	401 020 2904	CARBON 47K JA 1/4W	1
R220	401 025 8208	CARBON 22K JA 1/6W	1
R221	401 024 7707	CARBON 100K JA 1/6W	1
R222	401 024 7707	CARBON 100K JA 1/6W	1
R223	401 024 8001	CARBON 1M JA 1/6W	1
R224	401 027 0309	CARBON 47K JA 1/6W	1
R225	401 020 2904	CARBON 47K JA 1/4W	1
R226	401 020 2904	CARBON 47K JA 1/4W	1
R227	401 012 7009	CARBON 10K JA 1/4W	1
R228	401 012 7009	CARBON 10K JA 1/4W	1
R229	401 027 0309	CARBON 47K JA 1/6W	1
SWITCH P.C.B. ASSY			
22	620 189 5643	Switch P.C.B. Assy	1
SW101	620 015 1917	Keyboard Switch 6 mm (STATION1)	1
SW102	620 015 1917	Keyboard Switch 6 mm (STATION2)	1
SW103	620 015 1917	Keyboard Switch 6 mm (STATION3)	1
SW104	620 015 1917	Keyboard Switch 6 mm (STASION4)	1
SW105	620 015 1917	Keyboard Switch 6 mm (STATION5)	1
SW106	620 015 1917	Keyboard Switch 6 mm (STASION6)	1
SW107	620 015 1917	Keyboard Switch 6 mm (STATION7)	1
SW108	620 015 1917	Keyboard Switch 6 mm (STASION8)	1
SW109	620 015 1917	Keyboard Switch 6 mm (STATION9)	1
SW110	620 015 1917	Keyboard Switch 6 mm (STASION10)	1
SW111	620 015 1917	Keyboard Switch 6 mm (STATION11)	1
SW112	620 015 1917	Keyboard Switch 6 mm (STATION12)	1
SW113	620 015 1917	Keyboard Switch 6 mm (MEMORY)	1
SW114	620 015 1917	Keyboard Switch 6 mm (FM)	1
SW115	620 015 1917	Keyboard Switch 6 mm (MW)	1
SW116	620 015 1917	Keyboard Switch 6 mm (LW)	1
SW117	620 015 1917	Keyboard Switch 6 mm (DOWN)	1
SW118	620 015 1917	Keyboard Switch 6 mm (UP)	1
LED IND. P.C.B. ASSY			
23	620 189 5650	LED IND. P.C.B. Assy	1
	620 119 7655	LED Holder	1
	620 120 9730	Spacer LED	1
SW1	620 015 1917	Keyboard Switch 6 mm (STEREO/MONO)	1
SW2	620 015 1917	Keyboard Switch 6 mm (AUTO/MANUAL)	1
Q1	405 003 7702	TR 2SA1346	1

Ref. No.	Part No.	Description	Q'ty
D1	407 028 3806	LED SLP-165B-50 (TUNED)	1
D2	407 028 3806	LED SLP-165B-50 (STEREO)	1
D3	407 029 3607	LED SLP-183B-09 (STEREO/MONO)	1
D4	407 098 9906	LED SLZ-171E-03 (REMOTE CONTROL)	1
R1	401 027 5205	CARBON 680 JA 1/6W	1
R2	401 024 7004	CARBON 1K JA 1/6W	1
R3	401 024 7004	CARBON 1K JA 1/6W	1
R4	401 027 5205	CARBON 680 JA 1/6W	1
LAMP P.C.B. ASSY			
24	620 189 5278	Lamp P.C.B. Assy	1
	620 030 8144	Lamp	2
	620 052 0171	Spacer	2
PLUG P.C.B. ASSY			
25	620 190 7483	Plug P.C.B. Assy	1
	620 021 7590	Plug 10P	1
	620 190 8510	Bracket Connect P.C.B.	1
C1	403 072 2703	CERAMIC 0.022U Z 50V	1
C2	403 072 2703	CERAMIC 0.022U Z 50V	1

NOTES:

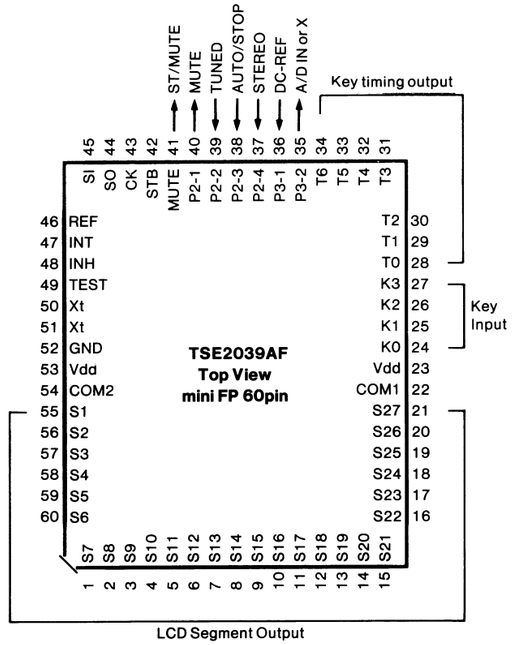
1. Parts order must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and resistors must be multiple of 10 pcs.

PRODUCT SAFETY NOTICE

Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual. Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

CPU PORT DESIGNATIONS (TSE 2039AF)

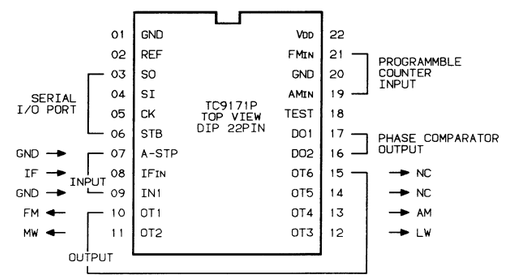
TSE 2039AF (TC9302AF) OUTLINE



Port	Pin No.	Segment Name COM1	Segment Name COM2	Explanation of Function
COM1	22	COM1	–	Common 1
S27	21	AM	FM1	AM : MW (2 band) FM1 : FM1 band
S26	20	MW	FM2	MW : MW band FM2 : FM2 band
S25	19	LW	FM3	LW : LW band FM3 : FM3 band
S24	18	AUTO	MANUAL	AUTO : Auto Scan MANUAL : Manual Scan
S23	17	CH	1bc	CH : 6 CH 1bc : 108.00MHz segment
S22	16	[5]	STEREO	[5] : point 5 on level meter STEREO : Stereo In
S21	15	TUNED	MUTING	TUNED : Input On MUTING : Stereo/Mute On
S20	14	2f	2b	2f-a : 108.00MHz segment
S19	13	2e	2g	
S18	12	2d	2c	
S17	11	–	2a	
S16	10	3f	3b	3f-a : 108.00MHz segment
S15	9	3e	3g	
S14	8	3d	3c	
S13	7	FM dot	3a	: 108.00MHz mark
S12	6	4f	4b	4f-a : 108.00MHz segment
S11	5	4e	4g	
S10	4	4d	4c	
S9	3	[1]	4a	[1] : point 1 on level meter (normally ON)
S8	2	5g	5be	5g-f : 108.00MHz segment, 0/5
S7	1	5acdf	[2]	[2] : point 2 on level meter
S6	60	[3]	kHz	[3] : point 3 on level meter kHz : MW/LW unit
S5	59	[4]	MHz	[4] : point 4 on level meter MHz : FM unit
S4	58	7f	7b	75-a: 6 CH segment
S3	57	7e	7g	
S2	56	7d	7c	
S1	55	MEMORY	7a	MEMORY : Store mode
COM2	54	–	COM2	Common 2

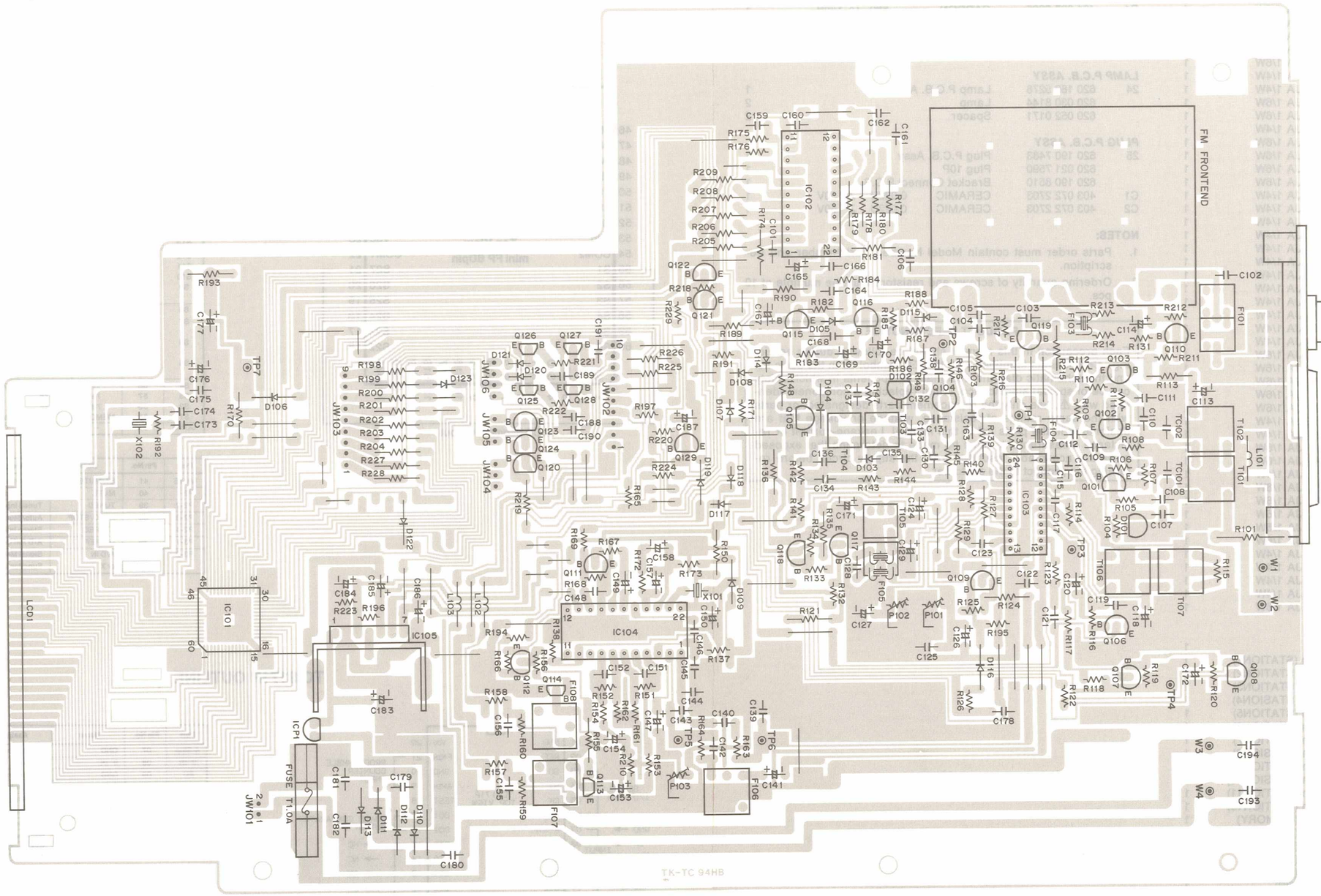
Port	Pin No.	Name	Assignment	Active	Initial
MUTE	41	ST/MUTE	Stereo/Mute Output	L	L
P2-1	40	MUTE	Mute Output	L	H
P2-2	39	TUNED	Tuned Input	L	–
P2-3	38	AUTO/STOP	Auto/Stop Input	L	–
P2-4	37	STEREO	Stereo Ind. Input	L	–
P3-1	36	DC-REF	A/D Ref Input	–	–
P3-2	35	A/D IN	Signal Meter Input	–	–
		or X	Function Output	H	L

TC 9171P OUTLINE

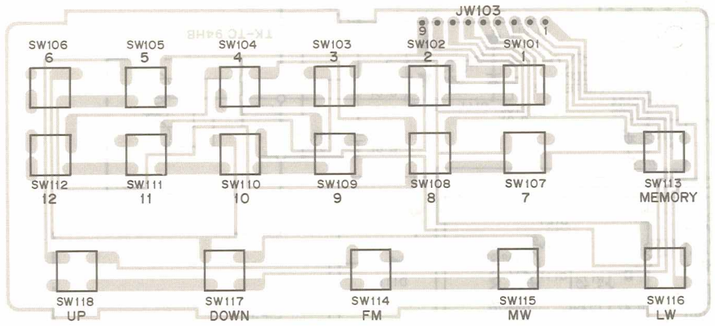


Port	Pin No.	Name	Assignment	Active	Initial
A-Stop	07	GND	Non Use Input	–	L
IF-IN	08	IF-IN	IF Input	–	–
IN1	09	GND	Non Use Input	–	L
OT1	10	FM	Band Output	H	H
OT2	11	MW	Band Output	H	L
OT3	12	LW	Band Output	H	L
OT4	13	AM	Band Output	H	L
OT5	14	NC	Non Use Output	–	L
OT6	15	NC	Non Use Output	–	L

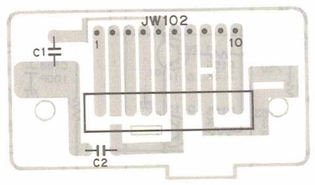
TUNER PRINTED CIRCUIT BOARD
(BOTTOM VIEW)



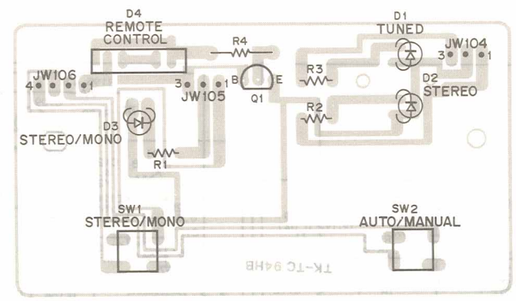
SWITCH PRINTED CIRCUIT BOARD
(BOTTOM VIEW)



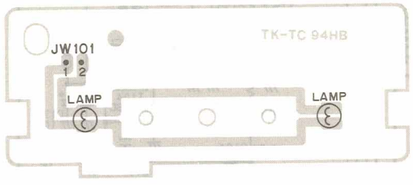
PLUG PRINTED CIRCUIT BOARD
(BOTTOM VIEW)



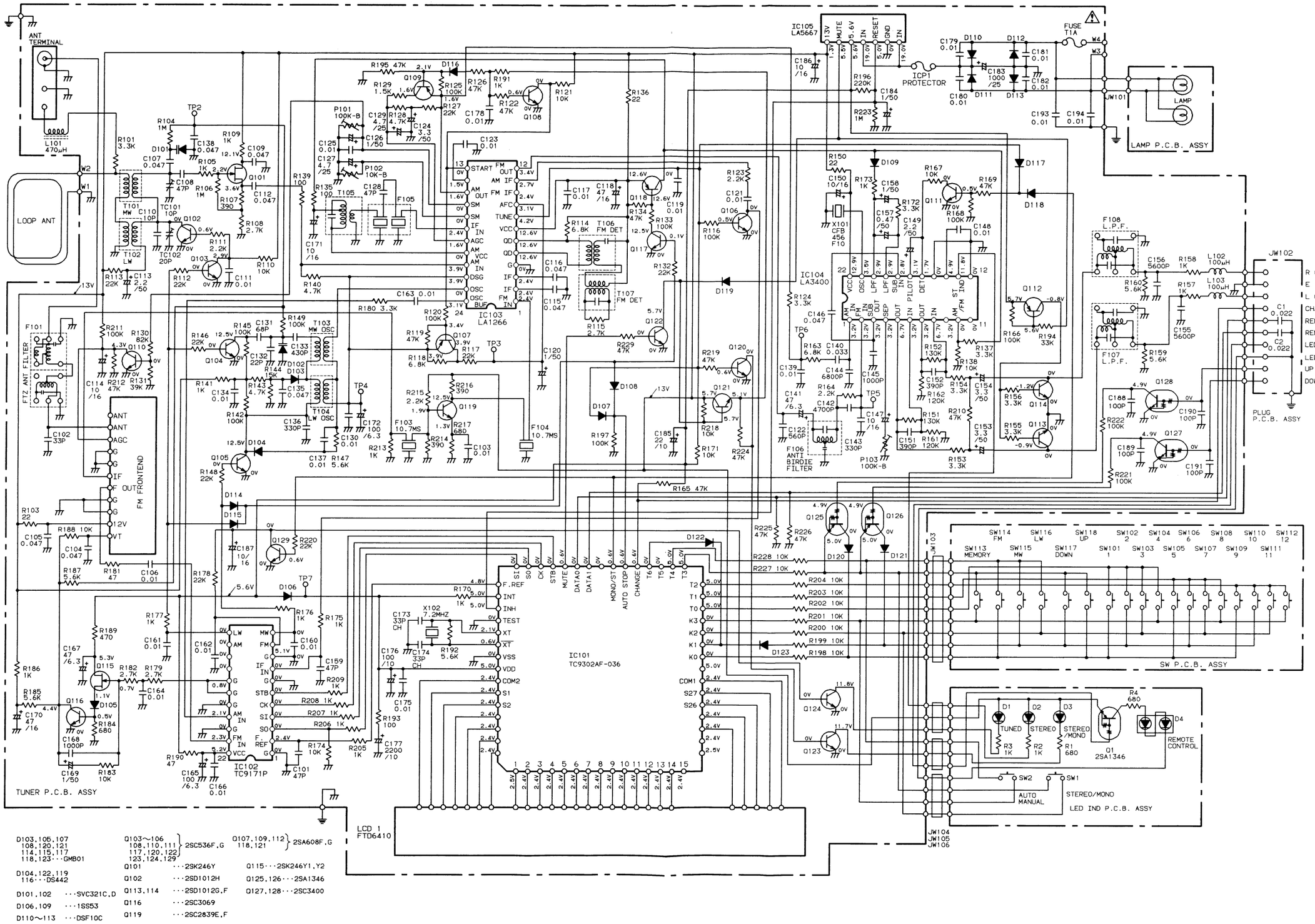
LED IND. PRINTED CIRCUIT BOARD
(BOTTOM VIEW)



LAMP PRINTED CIRCUIT BOARD
(BOTTOM VIEW)



SCHEMATIC DIAGRAM



D103,105,107 108,120,121 114,115,117 118,123···GMB01

D104,122,119 116···DS442

D101,102 ···SVC321C,D

D106,109 ···1SS53

D110～113 ···DSF10C

Q103～106 108,110,111 117,120,122 123,124,129 } 2SC536F,G

Q107,109,112 118,121 } 2SA608F,G

Q101 ···2SK246Y

Q102 ···2SD1012H

Q113,114 ···2SD1012G,F

Q116 ···2SC3069

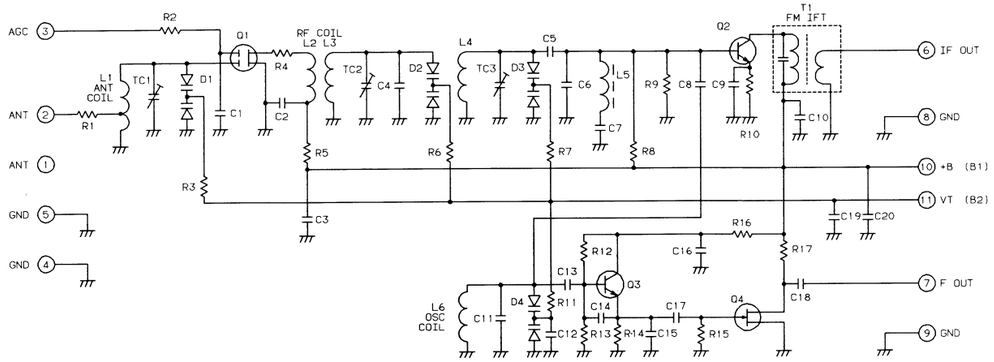
Q119 ···2SC2839E,F

Q115···2SK246Y1,Y2

Q125,126···2SA1346

Q127,128···2SC3400

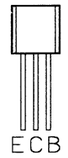
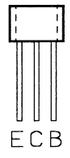
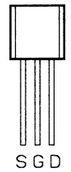
FRONT END SCHEMATIC DIAGRAM



NOTES:

1. All resistors values are indicated in "ohm" (K = 10^3, M = 10^6).
2. All capacitors values are indicated in "μF" (P = 10^{-12}).
3. All voltages indicated on the schematics are measured under the following conditions.
   a. Use a V.T.V.M.
   b. All voltages ±10 % with respect to chassis ground.
   c. No signals at input terminals.
   d. AC input at 16 volts 50 Hz.
4. This is a basic schematic diagram.

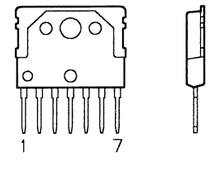
IC & TRANSISTOR LEAD IDENTIFICATION

TRANSISTOR	FRONT VIEW	BOTTOM VIEW	TRANSISTOR	FRONT VIEW	BOTTOM VIEW
2SA608 2SC3069 2SC536			2SA1346 2SC2839 2SC3400 2SD1012		
2SK246					

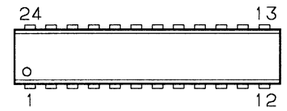
TERMINAL NAME

B → BASE
C → COLLECTOR
E → EMITTER
S → SOURCE
G → GATE
D → DRAIN

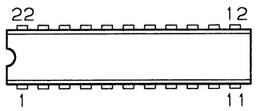
LA5667 FRONT/SIDE VIEWS



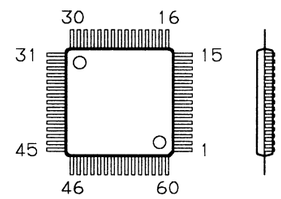
LA1266 TOP VIEW



LA3400 TOP VIEW
TC9171P TOP VIEW

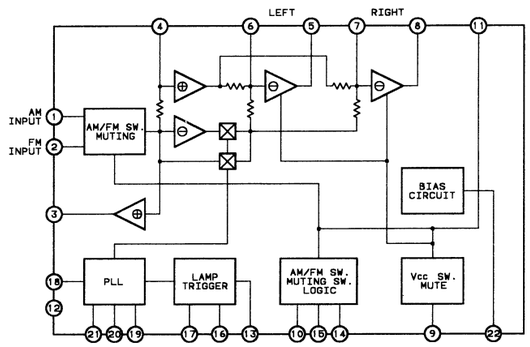


TSE2039AF TOP/SIDE VIEWS

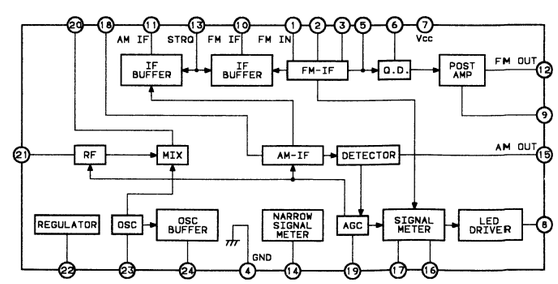


IC BLOCK DIAGRAM

LA3400 BLOCK DIAGRAM

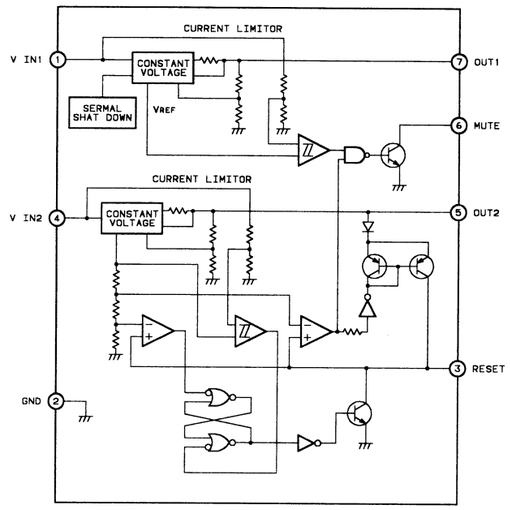


LA1266 BLOCK DIAGRAM

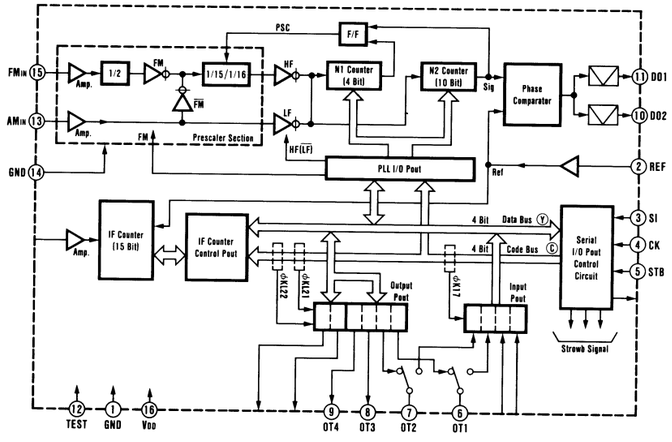


IC BLOCK DIAGRAM (Continued)

LA5667 BLOCK DIAGRAM



TC9171P BLOCK DIAGRAM



FISHER

FISHER Hi-Fi Europa Vertriebs GmbH

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Video	-172
Autoradio	-170
Ersatzteillager	-155/156
Techn. Schulung	-174

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Unser FISHER-Team steht Ihnen jederzeit gerne zur Verfügung. Ersatzteilbestellungen wickeln Sie bitte ausschließlich mit unserer Service-Zentrale München ab.
Senden Sie uns im Garantiefall die ausgefüllte Garantiekarte ein. Bei unverkauften Lagergeräten des Fachhandels gilt als Garantienachweis eine eidesstattliche Versicherung mit eingetragener Modellbezeichnung und Geräte-Nummer oder ein Liefernachweis. Die gleiche Regelung besteht auch für Reparaturaufträge.
Bitte geben Sie unbedingt die Ersatzteil-Nummer und die Modellbezeichnung an.
Sie sparen so wertvolle Zeit. Vielen Dank.

A47500 October/'88/2,500/K **Printed in Japan**